

Introduction and Overview
Process and Energy
Optimization (PEO)

Walt Smith, Principal
ETSI Consulting, Inc.
smithwaltp@aol.com

PEO Industrial Workshop
Co-sponsors: CERL, AMC & DOE

February 25-27, 2004

Gettysburg, PA

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE 25 FEB 2004		2. REPORT TYPE N/A		3. DATES COVERED -	
4. TITLE AND SUBTITLE Process and Energy Optimization (PEO)				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) ETSI Consulting, Inc.				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release, distribution unlimited					
13. SUPPLEMENTARY NOTES See also ADM001865, Industrial Process and Energy Optimization. Proceedings of the Industry Workshop Held in Gettysburg, PA, 25-27 February 2004., The original document contains color images.					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT UU	18. NUMBER OF PAGES 41	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			



Outline: PEO Overview

- Introduction, PEO Objectives and Goals
- The Warfighter Requirements, NADEP NI Results
- Overview: ETSI's PEO Features and Benefits
- The Six Features (Concepts) of PEO
- Summary: PEO in Three Words, Assessment Timeline, ETSI Facts, List of Some Facility PEO Assessments at DOD Sites



Outline: PEO Overview

- List Questions on PEO for Discussion at End
- A 3 hour Breakout Session is Scheduled for Thursday 14:00-17:00 hours
- We will further explore PEO methods and tools. A “mini-demo” PEO Assessment of Cleaning Shop processes is planned that provides an opportunity for your “hands on” participation.

Please join us to really see how PEO works!!



A Little of Our History on PEO

- Our 1980 Focus on Energy Efficiency...
- The Problem: No One was really listening....
- The New Direction: Combine w/ Process...
- New Message: Let us help you help yourself
- The Birth of PEO: We are PEO Experts...
- Ten Years Later: PEO, the \$ Saving Machine
- We have completed >160 PEOs over 20 years
- 40 New PEO Assessments on 2004 Schedule



PEO Objectives for DoD Fac

- Reduce energy **and** other operating costs by improving DoD processes to fully satisfy the requirements of the “Warfighter” customer
- Use the strengths of the PEO approach to focus on the big \$\$ problems and opportunities, to change what really matters and to do it fast.
- Complement and enhance the DoD’s ongoing Lean, Six Sigma and/or Airspeed initiatives throughout the DoD.



Warfighter Requirements*

- Reduce Cycle Time for a 9 day or 90 day Surge
- Increase “Capability” of Annual Depot Output
- Reduced Depot Work In Process (WIP) Inventory
- Reduced Operating Expenses for “\$\$ that Matter”
- Improved Scheduling Accuracy: Make it reliable
- On-Time Delivery: Cost for only 1week too late?
- Reduced Number of Assets in Depot Pipeline

***Reference: “Airspeed includes all aspects of Lean” (with ETSI edits)
by D. Nedresky, Network Magazine, October 2003**

Note: Warfighter = soldier, sailor, pilot and machine



PEO Goals & Expectations

- ID solutions to lower the annual energy and environmental costs by **15 -20%** for the **targeted** processes.
- Use energy to ID solutions to ***further*** reduce annual wasted \$\$ in ***Depot processes*** by **2-5 X** the “energy only” savings.

Depot Example: \$500 mil budget, \$10 mil energy
Savings: Energy= \$1.5 mil, Process= \$3-7mil/yr
Savings results are judged by the Depot Team.



Process Energy Optimization (PEO)

*A Better, Faster, Cheaper Approach
that Can Increase “Energy-Only”
Savings by Two to Five Times*

- ***What is Process Energy Optimization?***
- ***How is PEO different?***
- ***Features and Benefits of PEO***
- ***How DoD can use PEO to support existing cost control initiatives?***



NADEP North Island Results

“In a matter of a few weeks of intense onsite discovery efforts, **194** Process and Energy Optimization (PEO) measures were **identified** and **54** were **quantified** with supporting economics. **Savings = \$5,530,000 per year,**
Capital cost = \$7,820,000
Simple Payback = 1.4years”

*Jose Jiminez, NADEP North Island
Project Leader / POC 1998*



PEO Overview

- Features: ETSI's Approach Methodology
- Benefits: WIIFY, the Depot & the DoD
- DoD Example Results from PEO
- Summary, Conclusions
- A Next Step... the site/facility specific
“Needs Assessment Checklist for PEO”

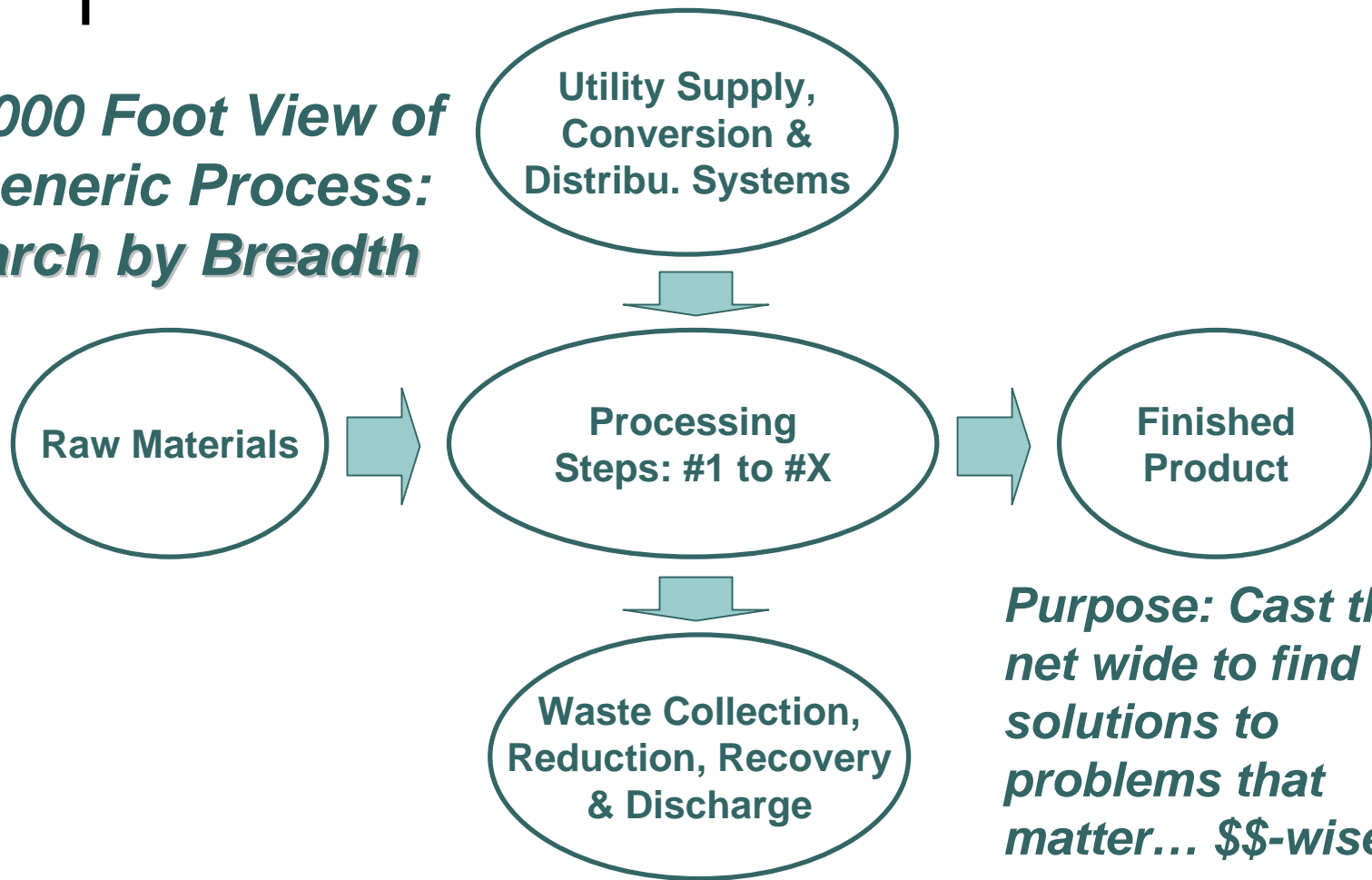


PEO Features and Benefits

Features (Concepts)	Benefits to You & the Fac.
Integrates Process and Energy	Lowers Unit Cost of Finished Product
Involves Depot Key People	Better Solutions, Commit to Implement
Focuses on Critical Cost Issues	Saves Time, Maximizes Results
Uses Financial & Technical Tools	Higher \$ Quantity and Quality Solutions
Creates Immediate \$\$ Results	Jump Starts Program, Instant Credibility
Generates User Friendly Report	Quickly Present and Implement Solutions

Concept One: Integrate Process and Energy Systems as 1 System

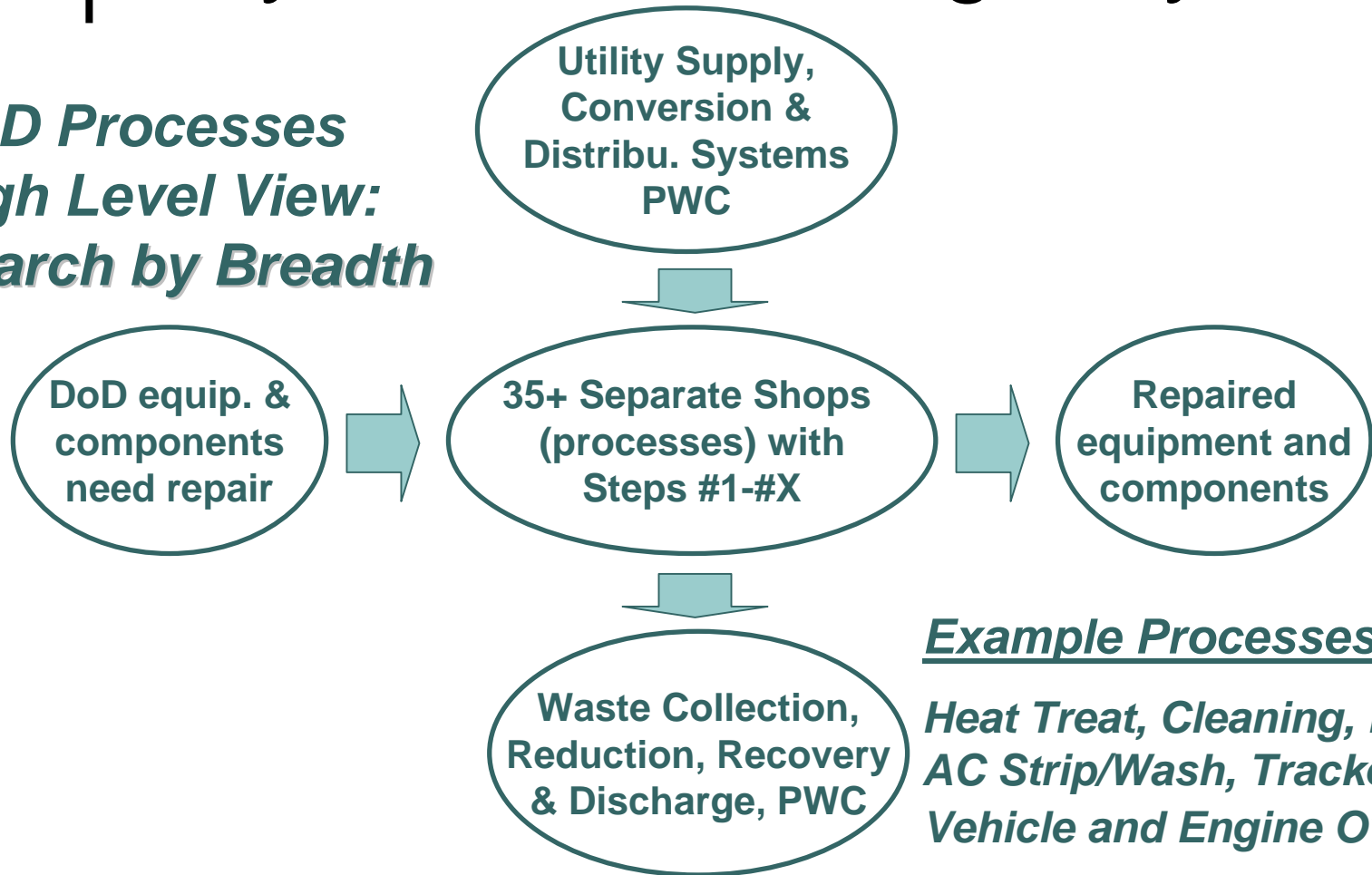
***30,000 Foot View of
a Generic Process:
Search by Breadth***



***Purpose: Cast the
net wide to find
solutions to
problems that
matter... \$\$-wise***

Integrate Process and Energy Systems as a Single System

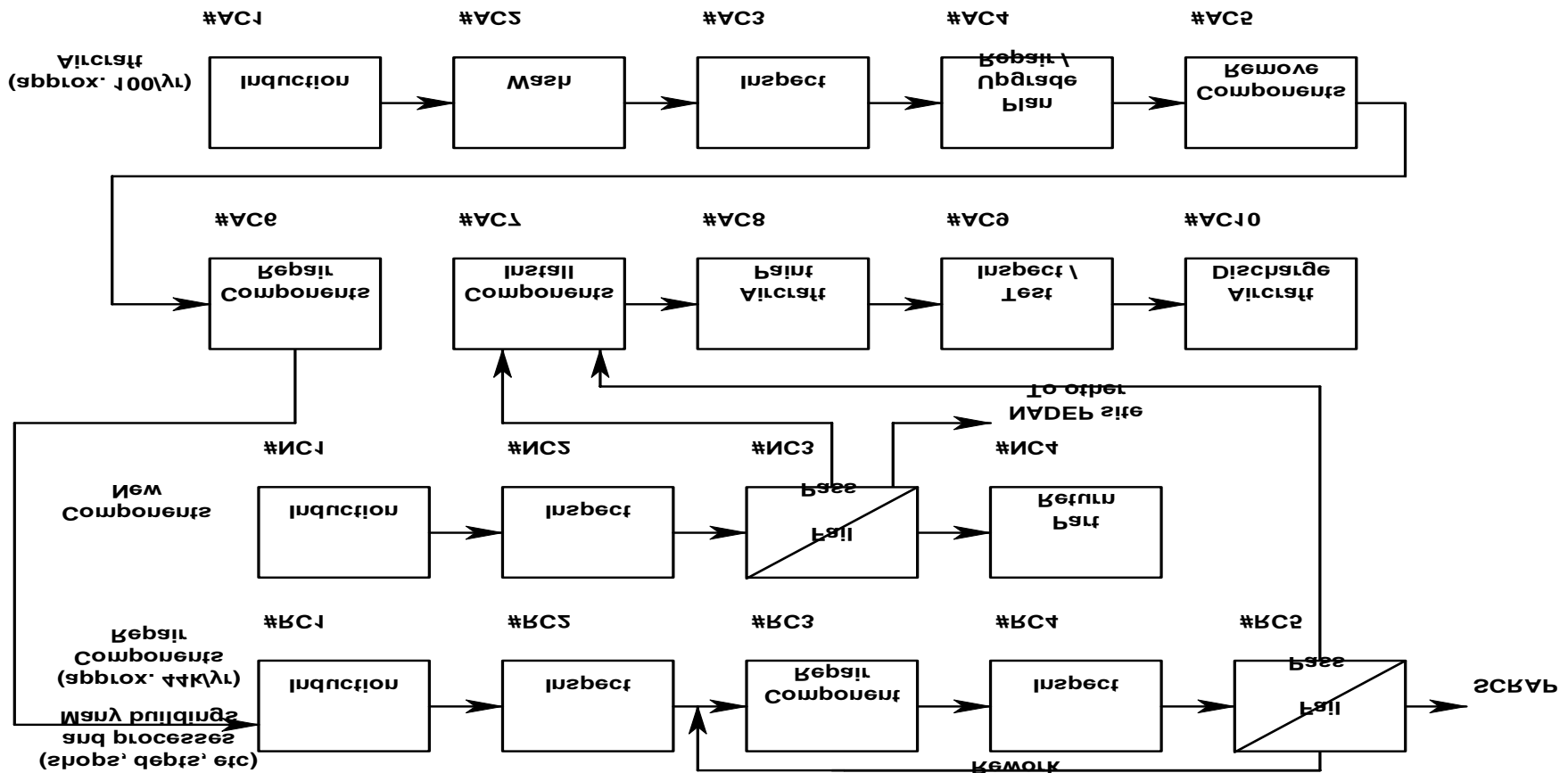
***DoD Processes
High Level View:
Search by Breadth***



Example Processes:

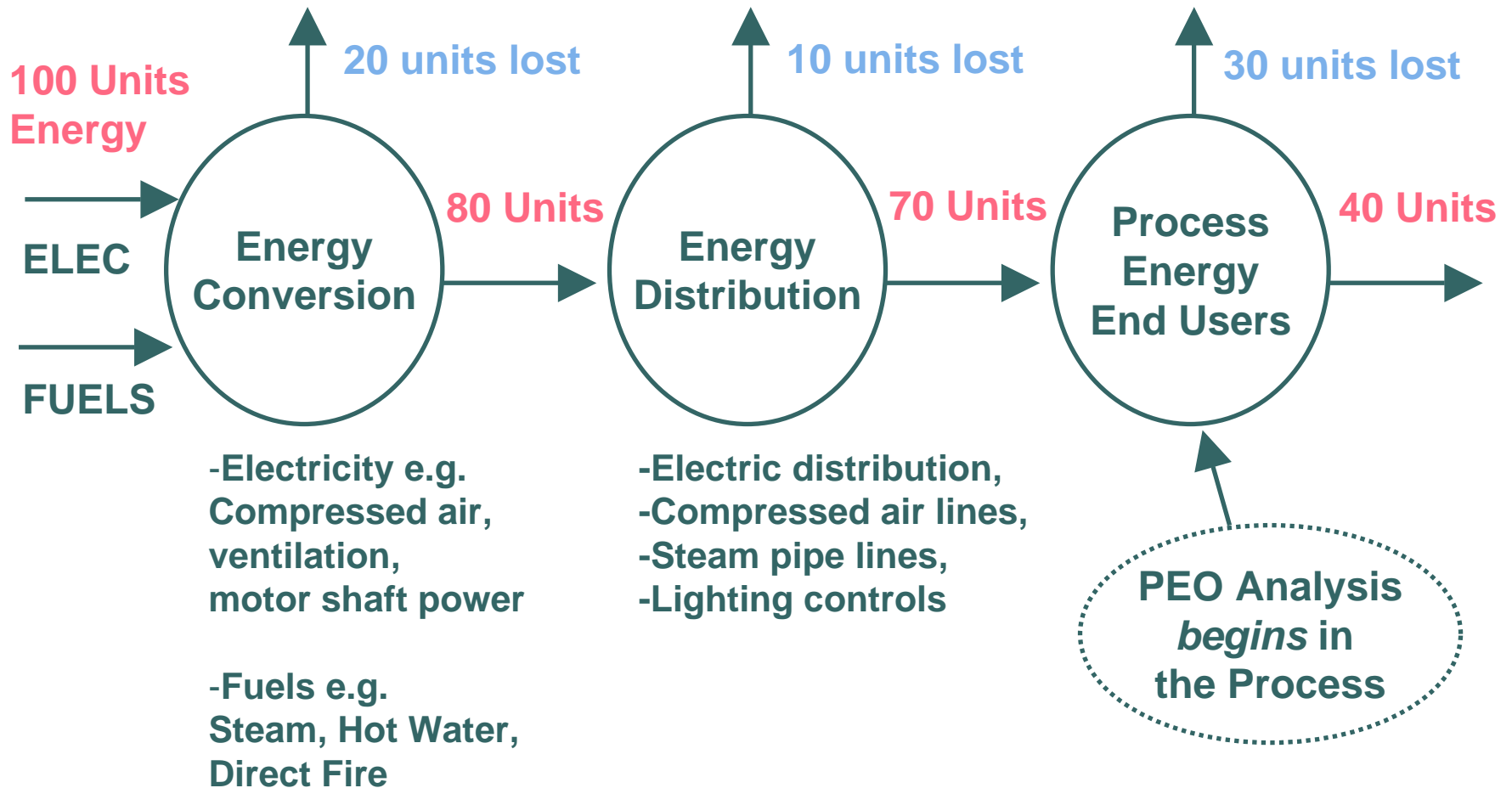
***Heat Treat, Cleaning, Plating,
AC Strip/Wash, Tracked -
Vehicle and Engine Overhaul***

Integrate Process and Energy Systems as a Single System



Process Energy Optimization (PEO) // LEANMADEP/ETSI // Feb. 2004

Integration of Process and Energy Reveals Where the Opportunities Are





Integrating Process and Energy

- Identifies Legitimate Process Energy Loads
- Uses Energy and Other Means **to Improve:**
 - + Utilization of Raw Materials (less scrap/waste)
 - + Tracked Vehicle or Aircraft Cycle Time (CT)
 - + Equipment & Components Quality/Safety
 - + Labor Utilization (morale) and Lower Emissions



Integrating Process and Energy

Benefits:

- Maximizes Opportunities for Savings
- Lowers Cost of Delivered Product/Service
- Improves Your Value to the Organization
- Your DoD Fac. Is Now More Competitive



Integrating Process and Energy

PEO Enhances your Existing PI* Initiatives

- **PEO complements Lean, 5Ss and Six Sigma**
- **PEO adds value to Process Improvement Teams**
- **PEO ‘speed’ can accelerate PI (done in days not mos)**
- **PEO loves AIRSPEED ‘thinkers’**
- **PEO hates WASTE (Materials + Labor + Output + \$\$)**

* PI is short for “Process Improvement”

Concept Two: Very Important ! PEO Involves Your Key People



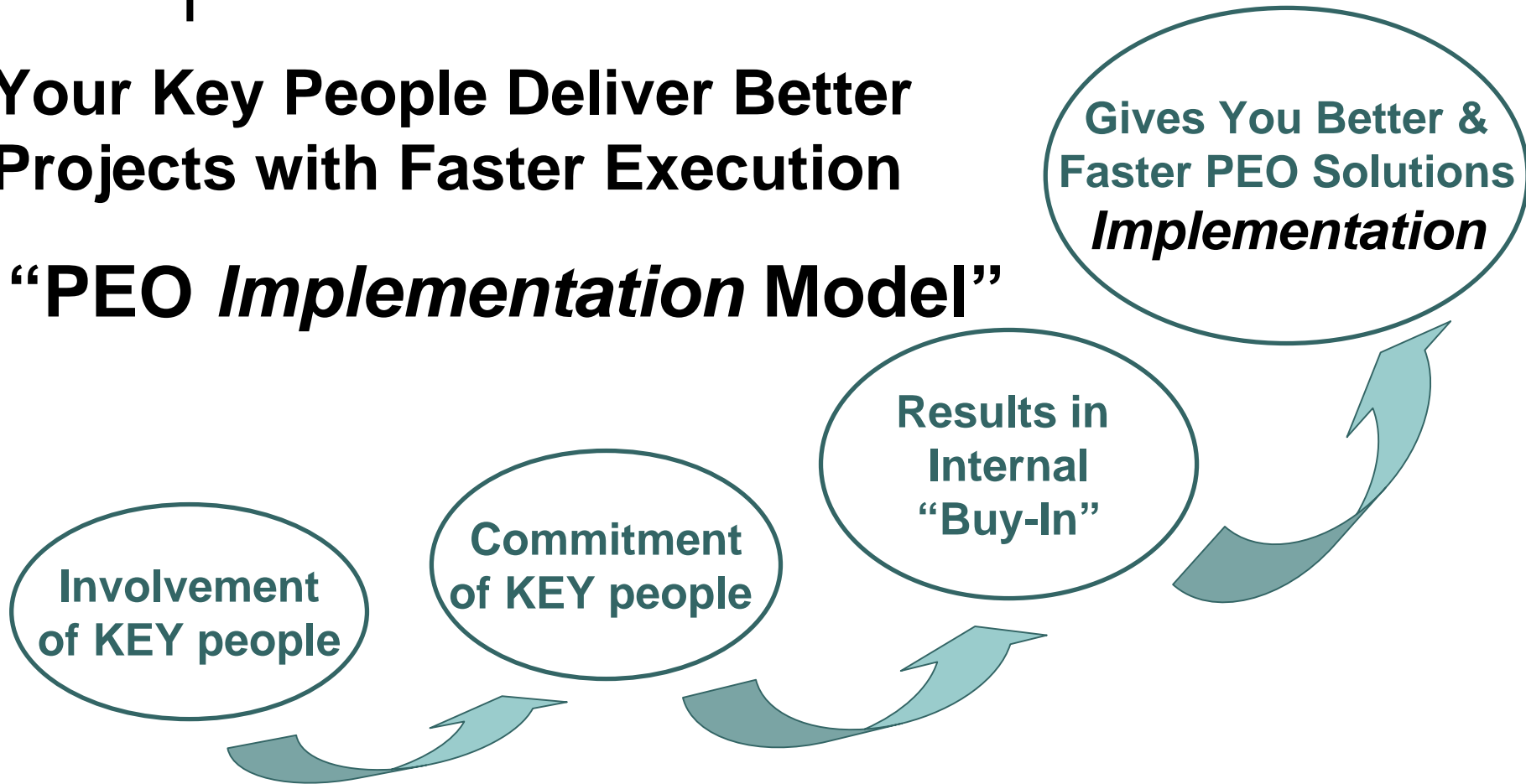
- Process Improvement Thinkers
- Shop-Floor Veterans
- Quality Control/Scheduling
- Cost Analysis & Control
- Facility Management
- PWC & Site Energy Systems
- Process Engineering
- Maintenance Expertise

*Involves Key People **ONLY**
on an '**AS NEEDED**' basis.*

Why Involve Your Key People?

Your Key People Deliver Better Projects with Faster Execution

“PEO *Implementation* Model”





Involves Your Key People

Benefits:

- Best use of everyone's time-on as needed basis
- Better quantity (2X) and quality of solutions
- Involvement produces practical* solutions
- Results are implemented in half the time

*judged by Depot participants, not consultants



Concept Three: Focus Only on Critical Cost Issues (CCIs)

- Areas of Waste and Missed Opportunity
- Focuses on What Financially Matters
- Work **Only On** the “top” Critical Cost Issues
- The Depot sets the Scope of Work by Selecting the Target CCIs and their respective Processes



Focus on Critical Cost Issues

Benefits:

- Saves You and Your Team Time (\$\$\$)
- Energizes Team to Make a \$\$ Difference
- Helps Your DOD Fac. Stay Competitive
- Maximizes Your Financial Results



Hypothetical DoD CCIs

What is the CCI?	Where is the CCI?	Cost (\$/yr)
Energy System Losses	Distribution System “A”, End User “B”	? \$
Cycle Time Problems	Ops Schedule, Bottlenecks in “Shop C”	? \$
Reliability Problems	Machine “D”, Process Area “E”	? \$
Ineffic. Comp. Air Sys	Shops “F and G”, Systems 3 and 5	? \$
Environmental Issues	Emissions/Wastewater in Process “H”	? \$

What CCIs come to mind at Your DoD Fac.?



Focuses on Critical Cost Issues

NADEP, North Island Example

- CCI: High energy and wastewater disposal costs in Plating Shop processes (Annual Cost > \$1million)
- Savings = \$647k/yr
- Capital Cost = \$1,417k
- Payback = 2.2 years

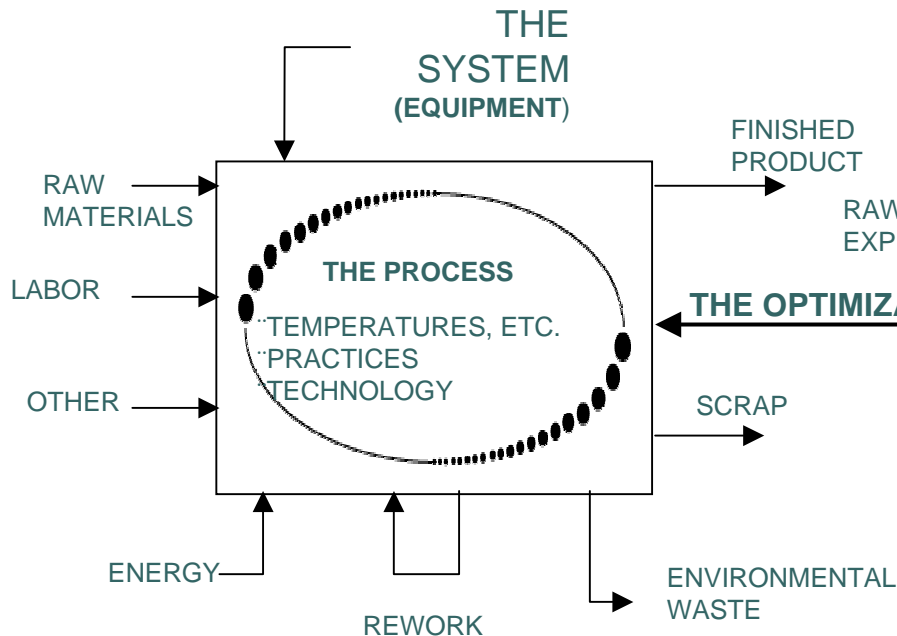


Concept Four: ETSI's Special Financial & Technical Tools

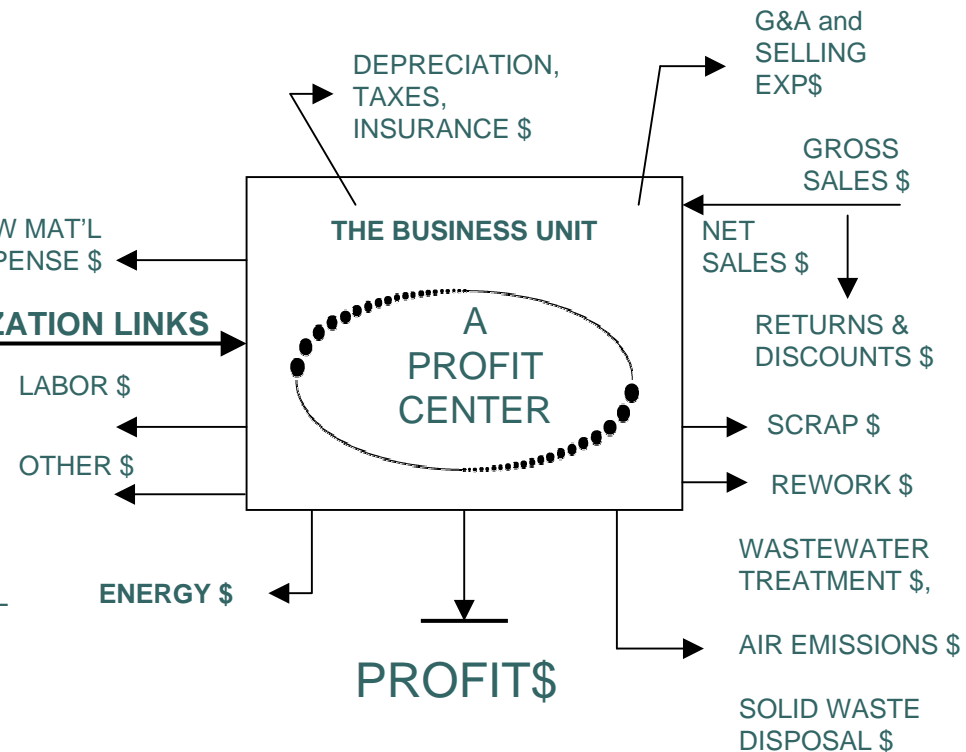
- Uses Unique Financial Modeling (10% what ifs)
- IDs the “Cost Equation” for the CCI (k\$/year)
- Develops One Line Balances (OLBs)
- Simplifies Process Understanding (PFD)
- Brainstorming Produces Best Solutions
- Clear Calculations of Solution Economics

Uses Financial & Technical Tools

An Engineering Model



A Financial Model





Uses Financial & Technical Tools

Benefits:

- Gets Everyone's Head in the Game
- SIG Generate More Ideas Faster
- Creates Higher \$\$ Impact Solutions
- Able to Better Quantify Solutions



Uses Financial & Technical Tools

NADEP North Island Example

- Effectively analyzed the combined value of energy, environmental and TAT (k\$/yr) from installing a 'closed-loop' vapor solvent cleaner in the Cleaning Department.
- Net Savings = \$242k/yr
- Total Capital Cost = \$500k
- Simple Payback = 2.1 years

Concept Five: Creates Immediate \$\$ Results



- No-Cost Solutions (SDs)
- Low-Cost Solutions (LUs)
- Very Practical Solutions
(Judged by Depot Team)
- Credible Economics



Creates Immediate \$\$ Results

Benefits:

- Jump Starts Program... Savings Start Now
- Enhances and Provides “Lift” to Airspeed
- Enables Depot to Package Projects
- Quickly Provides PEO Team Credibility



Creates Immediate \$\$ Results

NADEP North Island Example

- Identified 'no-cost' opportunities to reduce weekend and night time energy loads for 10 buildings.
- Savings= \$92 k/yr
- Capital Cost= \$0 k
- Payback = Immediate



Concept Six: Generates User Friendly Report

- New View of Process & Energy as One System
- Clear Understanding of Proposed Changes
- Clearly, Concisely Documents All Assumptions
- Shows Complete Solution Calculations
- Shows Savings, Cost & Simple Payback



Generates User Friendly Report

Sample EOM* and POM* “Write-Up” Outline

- Title / Facility / Area
- Background of Issue/Opportunity (base case)
- Descriptive Scope of Work (what changes?)
- List of Operating and Economic Assumptions
- Budget Savings and Cost Calculations
- Summary Results Table

* **EOM** =EG. Opt. Measure, * **POM** = Proc. Opt. Measure



Generates User Friendly Report

Benefits:

- Preliminary Results Backed Up with Data
- Quickly Can Develop Internal Presentation
- Priorities & Fast-tracks Project Implementation
- Allows the PI Teams to set Realistic Goals



Summary: Features & Benefits

Features	Benefits
Integrates Process and Energy	Lowers Unit Cost of Finished Product
Involves Key Depot People	Better Solutions, Commit to Implement
Focuses on Critical Cost Issues	Saves Time, Maximizes Results
Uses Financial & Technical Tools	Higher \$ Quantity and Quality Solutions
Creates Immediate \$\$ Results	Jump Starts Program, Instant Credibility
Generates User Friendly Report	Quickly Present and Implement Solutions



Summary: PEO in Three Words

Focus

Only Work on Critical Cost Issues

Change

Solutions that Financially Matter

Speed

Approximately 1-6 weeks Onsite

Summary: Typical Timelines

**Draft report delivered within
6 weeks of last day onsite**

**Done in 1-6 weeks of onsite
time over a 3-6 month period**

**Last day of each work session
concludes with summary
presentation to management**

**ETSI prep starts 1-2
months prior to onsite**





Example Military PEO Assessments

Re-Manufacture & Maintenance Facilities

- Pine Bluff Arsenal, AR
- NADEP North Island, CA
- Watervliet Arsenal, NY
- Norfolk Naval Shipyard, VA
- Crane Navy Base, IN
- Ft. Leonard Wood, MO
- Fort Carson, CO
- NADEP JAX, FL (Jan-July 2004)



Questions, Comments or Ideas

- Is there a need for PEO in your DoD Re-Mfg. and Repair Facilities? The NAC* will show the need.
- PEO lets you set the scope of work by targeting processes that have the most \$\$ potential
- PEO identifies specific CCIs and top solutions each with a clear descriptive scope and supporting economics (savings, cost and PB)

* NAC is a Needs Assessment Checklist (for PEO), available from ETSI via Email. **Your** input determines the **need**.



Tomorrow's Breakout Sessions

- A PEO Group Workshop is scheduled for Thursday from 14:00 till 17:00 hours.
- You and your Team will learn more about the PEO methodology and specific tools
- You will get a opportunity to role play in a “Mock, Mini” PEO analysis for a typical DoD repair/re-mfg. shop process

You are invited to join us and see how PEO is done!